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IN THE CLAIMS

1. (Withdrawn) A hydrogen gas detector calibration system, comprising:
 - a mixing tube;
 - a first conduit in fluid communication with a hydrogen-free gas, wherein the first conduit comprises a first orifice in fluid communication with the mixing tube;
 - an electrolysis cell for generating hydrogen gas;
 - a second conduit in fluid communication with the hydrogen gas, wherein the second conduit comprises a second orifice in fluid communication with the mixing tube; and
 - the hydrogen gas detector in fluid communication with the mixing tube.
2. (Withdrawn) The hydrogen gas detector calibration system of Claim 1, further comprising:
 - a first flow regulator in operable communication with the first conduit;
 - a second flow regulator in operable communication with the second conduit; and
 - a controller in operable communication with the first and second flow regulator.
3. (Withdrawn) The hydrogen gas detector calibration system of Claim 1, wherein the mixing tube comprises a container with at least one open end.
4. (Withdrawn) The hydrogen gas detector calibration system of Claim 1, wherein the mixing tube comprises a closed container, and wherein the hydrogen detector is disposed within the closed container.
5. (Withdrawn) The hydrogen gas detector calibration system of Claim 4, wherein the electrochemical cell system further comprises an enclosure and wherein the mixing tube further comprises a third conduit in fluid communication with the closed container and an environment within the enclosure.

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6. (Withdrawn) The hydrogen gas detector calibration system of Claim 1, wherein an outlet of the first orifice is disposed in a location diametrically opposed to an outlet of the second orifice.

7. (Withdrawn) The hydrogen gas detector calibration system of Claim 1, further comprising a hydrogen/water separation device in fluid communication with the electrolysis cell, wherein a gas portion of the hydrogen/water separation device is in fluid communication with the second conduit.

8 – 10. (Cancelled)

11. (Original) A process for operating an electrochemical system, comprising:
calibrating a hydrogen gas detector by
passing a hydrogen-free gas through a first conduit to the hydrogen detector,
wherein the hydrogen gas detector generates a first signal;
flowing a known quantity of hydrogen gas from a hydrogen/water separator
through a second conduit to the hydrogen gas detector, wherein the hydrogen gas detector
generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and
calibrating the hydrogen gas detector based upon the first and second signals;
introducing water to an electrolysis cell;
producing hydrogen;
separating hydrogen from water in the hydrogen/water separator;
introducing environmental gas disposed around electrochemical system components to
the hydrogen gas detector; and
determining the hydrogen concentration in the environmental gas.

12. (Original) The process according to Claim 11, wherein the calibration of the hydrogen gas detector further comprises mixing the hydrogen gas with hydrogen-free gas prior to introduction to the hydrogen gas detector, and wherein the mixture of the hydrogen gas and the hydrogen-free gas has a known hydrogen concentration.

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13. (Original) The process according to Claim 11, further comprising introducing hydrogen and oxygen to a fuel cell stack and generating electricity.

14. (Original) The process according to Claim 11, wherein calibrating the hydrogen gas detector further comprises generating additional signals, wherein each one of the additional signals corresponds to a different percentage of the hydrogen gas, and calibrating the hydrogen gas detector with the additional signals.

15. (Original) The process according to Claim 11, wherein the hydrogen gas and the hydrogen-free gas are at about ambient pressure.

16. (Original) The process according to Claim 11, purging the electrochemical system if the hydrogen gas concentration exceeds a selected amount.

17 – 20. (Cancelled)

21. (New) A process for operating an electrochemical system, comprising:
calibrating a hydrogen gas detector by
passing a hydrogen-free gas to the hydrogen detector, wherein the hydrogen gas detector generates a first signal;
flowing a known quantity of hydrogen gas to the hydrogen gas detector, wherein the hydrogen gas detector generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and
calibrating the hydrogen gas detector based upon the first and second signals;
introducing water to an electrolysis cell;
producing hydrogen;
separating hydrogen from water in the hydrogen/water separator;
introducing environmental gas disposed around electrochemical system components to the hydrogen gas detector; and
determining the hydrogen concentration in the environmental gas.

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22. (New) The process according to Claim 21, wherein the calibration of the hydrogen gas detector further comprises mixing the hydrogen gas with hydrogen-free gas prior to introduction to the hydrogen gas detector, and wherein the mixture of the hydrogen gas and the hydrogen-free gas has a known hydrogen concentration.

23. (New) The process according to Claim 21, further comprising introducing hydrogen and oxygen to a fuel cell stack and generating electricity.

24. (New) The process according to Claim 21, wherein the hydrogen gas and the hydrogen-free gas are at about ambient pressure.

25. (New) The process according to Claim 21, further comprising re-calibrating the hydrogen detector.